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for the Proposed Air Operating Permit Issued to

Kaiser Aluminum & Chemical Corporation
Mead Works
2111 East Hawthorne Road
Mead, Washington 99021

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DEPARTMENT OF ECOLOGY
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Introduction

This Operating Permit Support Document fulfills the operating permit rule “Statement of Basis” requirement and explains particular portions of the air operating permit for the Kaiser Aluminum & Chemical Corporation located in Mead, Washington.

This document is not part of the operating permit for Kaiser Aluminum & Chemical Corporation. Nothing in this document is enforceable against the permittee, unless otherwise made enforceable by permit or order.

Statement of Basis

When the Department of Ecology issues a draft operating permit, it is required to provide a statement that sets forth the legal and factual basis for the draft permit conditions, including references to the applicable statutory or regulatory provisions. [WAC 173-401-700(8)]

Facility and Process Descriptions

In January 2001, Kaiser temporarily halted operations at its Mead smelter due to, among other things, high electricity prices. At full production, the Mead Works produces 233,000 tons per year of primary aluminum. When the molten aluminum is produced, it is trasferred by metal products workers to several locations. The majority of Mead’s product is delivered to the Trentwood rolling mill. The remaining metal is solidified into aluminum shot and ingot “sows” before shipment to customers. Aluminum shot are small pellets of aluminum made by pouring molten aluminum through a vibrating sieve into a water bath. Shot is produced in a variety of grades and sizes to meet different customer needs. Sows are 1,000-pound aluminum ingots.

The basic process for this reduction requires the electrolytic decomposition of alumina into the two chemical components (Hall-Heroult process) which are metallic aluminum and gaseous oxygen. In order to do this, alumina must be disolved in an electrolytic bath that allows the direct current to pass through it. The process uses a fluorinated salt, sodium aluminum fluoride or cryolite in a molten state (1000˚C) as the electrlytic bath. The alumina is fed into the molten electrolytic bath where it dissolves. The electrolytic bath is saturated at about 8% alumina. Molten aluminum, which is released during the electrolysis, has a slightly higher specific gravity than molten cryolite at the cell operating temperature, and therefore will settle to the bottom of the cell. The electrolytic cell consists of a steel shell lined with insulating materials and having an electrically conductive bottom made of carbon connected to the negative polarity of the power source. Hanging above and dipping into the electrolytic bath are carbon anodes connected to the positive polarity. When the electric current flows from the anode to the cathode, alumina is split into metallic aluminum which spreads over the cell bottom and into oxygen which evolves on the immersed surface of the carbon anode. The carbon anode and the oxygen react electrochemically releasing carbon dioxide gas. A portion of the carbon dioxide back reacts with alumminum to produce carbon monoxide gas and aluminum oxide. Particulate and gaseous fluorides also evolve from the bath due to the operating temperatures of the cells.

There are two basic cell designs, prebake and Soderberg. The Mead smelter operates center-worked prebake (CWPB) cells. Prebake cells utilize carbon anodes, made from petroleum coke and coal tar pitch which have been processed into blocks, baked, and secured onto copper rods prior to being used in cells. In a prebake smelter, there are two rows of anodes in each cell and several anodes on each row. The anodes are electrically connected in parallel with the ability to individually control the depth of immersion of each anode in the bath. The crust overlying the molten bath is broken and ore is fed by means of a crust breaking and feeding system that is located along the cell's centerline between the two rows of anodes. The individual cells are arranged in "potlines" which are rows of cells connected electrically in series. Each potline occupies two long "potrooms." Mead has 16 potrooms (8 potlines) and each potroom has 71 cells (Potroom #4 only has 70 cells).

Air pollution control is an integral part of operating a primary aluminum smelter due to the use of the alumina in the air control system for recovery of particulate and gaseous fluorides. Air pollution control systems employed at Kaiser Mead includes the following:

1. For potlines, a primary emission control system captures cell fumes. The system consists of an enclosure around each cell with a system of side, end, and quarter shields, a system of ducts and fans which draw the fumes from each cell to a centralized treatment system. The primary system consists of alumina dry scrubbers which use fluidized beds of alumina to scrub and adsorb the gaseous hydrogen fluoride from the gas stream. The primary system also consistes of baghouses for removing PM from the gas stream. The alumina and the recovered material (fluorides and particulate matter) are returned to the cells. The smelter has eight potlines. The dry scrubbler system contains eight reactors per potline and four modules per reactor. Each module contains 195 bags and a set of stacks above the bags.
2. A new anode bake furnace with a new dry alumia dry scrubber system (Procedair) was installed in late 1997. Bake oven gasses consist of combustion products from natural gas and from volatile matter driven off the baking anodes and burned in the ovens and particulate matter from the packing coke surrounding the baking anodes. Kaiser rebuilt an existing baking furance located in Building 53 in 1998. The offgas from this furnace is also controlled by the Procedair scrubbler. The system contains four reactors.
3. A coke dry scrubber system is used for emissions control in the paste plant where petroleum coke and coal tar pitch are heated, mixed, and pressed into anode blocks. Carbon particles and organic vapors escape from these processes. The coke scrubber adsorbs volatile material onto calcined coke, and a baghouse captures the resulting particles, the captured particles are then returned to carbon plant for reuse.
4. An air emissions control system services the coke calcining process at Mead's South Plant. The coke calciner's production capacity is about 105,000 tons per year. The offgas from the process is treated by a combustor to remove volatile organics, an SO_2 scrubber to remove sulfur dioxide and a baghouse to remove particles.
5. Many ancillary processes in the plant are equipped with nuisance dust collectors (baghouses).

While the air pollution control devices remove a very significant amount of the pollutants (well over 90%), ninety percent of the remaining particulate and fluoride emissions are a direct function of operation and maintenance of the pots and the pots' enclosure system. Pollutants not captured by the primary emission system are released without treatment through roof vents to the atmoshpere. Accordingly, Kaiser's workforce and the maintenance and repair activities associated with pot shields has a very direct affect on the amount of air pollutants emitted from the smelter.

The major air emissions discharged from potroom roofs are particulate matter (PM) and hydrogen fluoride (HF). Some of the PM emissions that escape from the primary collection system settle within the potrooms. All gaseous air emissions, like HF, that escape the primary collection system are released through the roofs to the atmosphere. Therefore, the HF emssions from the potroom roofs are good indicators of the effectiveness of potroom operation and maintenance activities.

At the end of this document, in Appendix A, are two graphs of Kaiser's HF emissions during the years 1994 to 2000. One graph shows monthly average emissions and on the other shows annual average emissions. The annual average emissions graph shows increasing HF emissions from 1994 through 1996, decreasing emissions from 1996 to July 1997, increasing emissions from 1997 to 1998 and a sharp decrease from 1998 to 2000. Since aluminum production was completely curtailed for an indefinite period of time in December 2000, there is no more recent data available.

Kaiser's compliance history related to air emissions from 1996 to 2000 is presented in the following table:

Emission Standard	**Violation**	**Date of Violation**	**Docket No.**	**Penalty**
WAC 173-415-030(6)	Bypass – excess emissions	04-12/99	00AQIS-727	$9,600
WAC 173-415-030(6)	Bypass – excess emissions	09/98-04/99	99AQ-I042	$58,800
WAC 173-415-030(2)	PM/ton > 15.0 limit	01/99	99AQ-I017	$37,200
DE 96 AQI-071	SO_2/ton > 4.5	10/98	99AQ-I027	$18,400
WAC 173-415-030(2)	PM/ton > 15.0 limit	10/98	99AQ-I007	$24,800
WAC 173-415-030(6)	Bypass – excess emissions	05-09/98	98AQ-I063	$19,600
WAC 173-415-030(6)	Bypass – excess emissions	11/97-05/98	98AQ-I062	$4,600
WAC 173-415-030(2)	PM/ton > 15.0 limit	04/97	98AQ-I032	$12,000
DE 92 AQI-116	PM > 0.01 gr/dscf limit	09-10/96	96AQ-I098	$3,800
WAC 173-415-030(6)	Poor O&M at potrooms	06/96	96AQ-I085r	$4,200

Most of these violations were related to the startup of the new anode bake furance air control system. The new emissions control system had some control logic design and electrical installation problems that resulted in more than 200 incidences of unplanned air control system and furnace shutdowns that caused the bypassing the furnace venting gases during the first two years of operation.

Comments on Specific Permit Conditions

This section primarily describes decisions that were made when "gapfilling" was needed for applicable requirements that didn't specify monitoring methods or the monitoring frequencies. This section also identifies applicable requirements that have been previously satisfied by the permittee. The order followed in these "Comments on Specific Permit Conditions" coincides with the first time each applicable requirement appears for the first time in the permit. Because there are numerous emission units for which an applicable requirement applies, the applicable requirement is discussed only once.

A) Opacity Permit Conditions (1.a), Fugitive Emissions (1.c), and Fugitive Dust (1.h):

All aluminum plants are required to meet the emission standards of WAC 173-415-030 and -060. WAC 173-415-030 states that “specific emission standards listed in this chapter will take precedence over the general emission standards of Chapter 173-400 WAC. The requirements of conditions 1.a (WAC 173-415-030(3) and 1.c (WAC 173-415-030(4)) in this permit are at least as stringent as and take precedence over the requirements for visible emissions (WAC 173-400-040(1)) and fugitive emissions (WAC 173-400-040(3)(a)), respectively.

The permittee will be required to take corrective action any time visible emissions are observed. This requirement is more stringent and will provide a greater environmental benefit than requiring the permittee to conduct opacity readings because the permittee is required to take corrective action at any level of opacity, even below the applicable opacity limitation. This approach is referred to as “see it, fix it.” This “see it, fix it” approach is an ongoing requirement, but once per week the inspections are documented in writing with the date, the inspectors name and signed initials, and any observations.

The "see it, fix it" approach is also applicable to fugitive emissions (WAC 173-415-040(3)) and fugitive dust (WAC 173-400(8)(a)) because with these regulations, monitoring is accomplished by frequent observations and compliance by prompt repairs when necessary. Accordingly, the "find it, fix it" approach has been used for permit conditions 1.c, fugitive emissions and 1.h, fugitive dust.

There is a general relationship between visible emissions and grain loading that supports using opacity as measurement for compliance. However, a specific correlation between visible emissions and grain- loading has not been established that can translate a specific level of visible emissions to a quantity of particulate matter.

Listed below are eleven sets of data for opacity (Op.) and grainloading (gl in 1,000 x gr/dscf) obtained in 2000 from testing the emissions of the Procedair system.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Op. %	1.27	0.15	0.41	0.50	0.64	0.86	1.08	1.03	0.90	0.41	0.66
gl	1.45	0.36	0.40	0.10	1.00	1.20	0.40	0.90	1.40	1.10	1.30

Opacity ranges are from 0.4 to 1.2 percent and the grainloading ranges are from 0.0004 to 0.0014 gr/dscf. A grainloading value of 0.001 gr/dscf equates to an opacity reading of about one percent. In general, while observing stack emissions; we will see some emissions from the stack as soon as the opacity is above 5 percent. One might ask the question, if one percent opacity at this emission unit is equivalent to 0.001 gr/dscf, then what grainloading is a five percent opacity reading equivalent to. There are not enough data points to statistically demonstrate the correlation between opacity and grainloading. However, from a common sense point of view, we might be able to allow that the five percent opacity is likely to be much less than or at worst case equal to 0.1 gr/dscf because the opacity is increased only by five times while grainloading is increased by approximately 100 times. Therefore a unit without visible emissions (less than 5% opacity) would be meeting the grainloading requirement of 0.1 gr/dscf.

Accordingly, the "see it, fix it" approach provides a measure of continuous compliance for grainloading requirements subsequently discussed in section D.

B) Fallout (1.b), Odor (1.d), and Emissions Detrimental to Persons/ Property (1.e)

Fallout, odor and emissions detrimental to persons or property, have not been historical problems at Kaiser's Mead Works. The situations for which these regulations apply are when fallout, odor, or emissions detrimental impact Kaiser's neighbors. Notification of such problems would be expected to come from complaints by those property owners or personnel off the plant site. However, the permittee's own employees could also complain. Accordingly, these permit conditions are complaint driven and require the permittee to record any complaints received, assess the validity of the complaint, and to take corrective action if the complaint is validated.

C) SO_2 Permit Conditions (1.f and 1.g):

All aluminum smelters are required to meet the emission standards of WAC 173-415-030 and -060. WAC 173-415-030 states that "specific emission standards" listed in this chapter will take precedence over the general emission standards of Chapter 173-400 WAC. The requirements of condition 1.f (WAC 173-415-030(5)(a)) in this permit are at least as stringent as and takes precedence over the requirement for SO_2 in WAC 173-400-040(5)(b).

WAC 173-415-030(5) limits sulfur dioxide emissions from aluminum smelters to 60 lb per ton of aluminum produced on a monthly maximum basis, and also limits emissions to no more than 1,000 ppm SO_2. Smelters presently control SO_2 emissions by limiting sulfur content in the coke and pitch used in the anodes.

Using Kaiser's reported data for emissions and airflow rates, Ecology determined that Kaiser is unlikely to violate the 1,000 ppm SO_2 standard of WAC 173-400-040(5)(b), with the possible exception of an upset condition.

The limit of 60 pounds of SO_2 per ton of aluminum produced, contained in WAC 173-415-030(5)(a), is based on a ratio of 0.5 pounds carbon to 1.0 pound aluminum and a 3 percent sulfur content in the carbon material. Compliance will be determined by a mass balance calculation, or, alternatively by source testing. The equation used for the mass balance calculation to determine the pounds of SO_2 per ton of aluminum produced limit is as follows:

$$\text{Pounds } SO_2\text{/ton Al} = (\Sigma C x S_C + \Sigma P x S_P + \Sigma O x S_O) \text{ x } 40/\text{Al}$$

where C, P, and O are the coke, pitch, and fuel oil usage during the month, in tons; S_C, S_P, and S_O are the sulfur content of coke, pitch and fuel oil respectively, expressed as a percentage for the materials used during the month; and Al is the aluminum production for the month. The factor of 40 derives from converting tons of raw materials to pounds (2,000 lbs/ton), converting the percentage of sulfur in raw materials to a decimal fraction (100), and converting the weight of sulfur to the weight of SO_2 (one pound of sulfur combines to make two pounds of SO_2).

For 1999 Kaiser reported 44.7 pounds of SO_2 per ton of aluminum produced.

D) Grainloading Requirements for Non-potline Sources

WAC 173-400-060 limits emissions of particulate matter to no more than 0.1 grains per dry standard cubic foot (gr/dscf). This regulation does not specify a testing or compliance frequency for this standard. All the baghouse units with administrative orders are limited to a PM emission of 0.01 or 0.005 gr/dscf. These limits are more stringent than the limit required by WAC 173-400-60.

Ecology considered the following criteria to help arrive at appropriate periodic monitoring:

1. <u>Likelihood of violating the applicable requirement (i.e. margin of compliance)</u>: Baghouses, when properly operated & maintained, will consistently emit low grainloading concentrations (< 0.005 gr/dscf) at aluminum smelters.
   Kaiser has extensive testing data on their potline primary air control system, their coke calcining emission control system, and their carbon bake scrubbing system. Kaiser also has initial compliance testing data for its smaller ancillary units. All of these units are baghouses.

2. Whether add-on controls are necessary for the unit to meet the emission limit: Insufficient information is available to make this determination. Many of these processes without air pollution control devices (baghouses) would likely exceed the 0.1 grains/dscf limit. With frequent visual checks and inspection of equipment, there is a greater likelihood than with infrequent source testing these problems would be rapidly detected and corrected.

3. Variability of emissions from the unit over time: Source test data from the potline dry scrubbers indicates that while the emission values of these units are very low, there can be large differences between test results even for the same unit. Accordingly, ancillary and supporting process units that aren't as highly visible and which currently don't have an intensive oversight program like the potline primary air pollution control system might be expected to have a higher degree of variability.

4. The type of monitoring, process, maintenance, or control equipment data already available for the emission unit: Kaiser is not consistently required to inspect emission units for pressure drop, visible emissions, or other anomalies. Kaiser will be required to conduct functional integrity inspections for each emission unit.

   The minimum requirements of a functional integrity inspection for a baghouse (or other air emissions control devices) and its emission unit will include a check of the following parameters: visible emissions ("see it, fix it" approach), ductwork and housing leaks, pressure drop, and excess vibration/noise. Records of the inspection results for these parameters and any resulting corrective actions will be required to be maintained. Kaiser will also be required to initiate corrective action within 24 hours if problems are observed during the inspections. Initiating corrective action may include, but is not limited to, preparing a work order, ordering parts, shutting down the unit, or completing the repair that eliminates the problem.

5. Technical and economic considerations associated with the range of possible monitoring methods:

   Source testing of small, low volume, non-potline related emission units is expensive and time consuming when balanced against the mass emission rate of PM from these units. In addition, malfunctions in these units in the form of fallen or broken baghouse filter bags cause visible emissions due to the high percentage of the cloth area that a single bag represents in this size of unit as compared to the potline air control system. Thus, for these non-potline emission control units, the primary regulatory concern is to assure good operation and maintenance practices. This can be ensured by requiring a combination of functional integrity inspections, the "see it, fix it" approach, and some frequency of source testing that confirms the adequacy of the inspection to maintain compliance with the grainloading requirements.

6. The kind of monitoring found on similar emission units: Kaiser's operation is primarily a materials handling process of material that is very fine grained and en-trainable in the air.

Baghouses are used by all aluminum smelters for PM emissions control. Visible emissions checks and source testing have become common monitoring methods for baghouses.

7. Potential for environmental impact: Based upon air flow, the environmental impact from baghouses not directly associated with the potlines is very low. Total air flows (approximately 480,000 cfm) from all these (52) units is less than three percent of the airflow from the potlines' roof vents (approximately 16,000,000 cfm) and the dry scrubbers (approximately 2,240,000 cfm).

   Considering all of the above criteria together Ecology concluded the most important factors for determining the source test schedule used in this permit are air flow of the emission unit and whether the emission unit is controlled or uncontrolled. All emission units of concern are controlled. The end result is that a baghouse controlled emission unit should be source tested while its air flow is about 20,000 cfm. A few large emission units and questionable emission unit(s) also required to conduct monthly emission testing by using EPA Method 9. These units include 2.8, 3.6, 5.2, 8.5, and 4.5.
   The grainloading conditions in this permit for units 2.8, 3.2, 3.3, 3.4, 3.5, 5.2, 6.3 (BH 145 and BH 155), 6.4 (BH 448), 8.4, and 8.5, require the permittee to conduct source testing (EPA Method 5 or 17) at defined intervals in order to certify compliance with those limits. The total air flow for these 11 baghouses requiring source tests is approximately 319,000 cfm, which is only 1.7 percent of the total air emissions at the facility (18,718,050 cfm).

   Source testing for the following smaller units will not be required (2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1, 3.6, 3.7, 3.8, 3.9, 3.10, 4.5, 5.4, 5.5, 6.3c-d, 6.4a-d, 6.5a-c, 7.3, 7.4, 8.6, 8.7, 9.1, and 9.2 (0.1 gr/dscf limit), and: 2.1, 5.1, 5.3, 7.1, 7.2, 8.1, 8.2, and 8.3, (0.01/0.005 gr/dscf limit). The total air flow for these 37 baghouses is approximately 159,000 cfm, and it is only 0.85 percent of the total facility air flow (18,718,050 cfm).

   Emission units with a 0.1 gr/dscf limit are also required to limit the visible emissions from stacks to 20 percent opacity. Opacity exceeds 5% if you look at a stack with the sun behind you and you see any smoke. If the visible emissions from a stack are just over 5 percent opacity, its PM emissions will likely still be within the 0.1 limit in most of the practical conditions for aluminum smelters. Therefore, using the visible emissions check in conjunction with the functional integrity inspection, as a surrogate for source tests is a very practical approach, especially for these small baghouse units which account for only 5 % of the particulate emissions from the whole facility.

   The requirement to conduct functional integrity insepctions is applicable to each emission unit discussed above. The functional integrity inspections will provide an indicator of on-going compliance. The information gathered during the functional integrity insepctions is used as a surrogate for actual testing to determine if the equipment is operating within specifications outlined in Kaiser's standard operating procedures. The requirements to conduct functional integrity inspections, to properly operate and maintain the equipment, and to take corrective action when necessary are ongoing requirements which provide the assurance that the emission unit is in compliance. These requirements provide a compliance tool that is frequent, thorough, and consistent versus a source test or opacity readings that only indicate whether Kaiser is in compliance with a permit limit at one point in time.

E) Grainloading Requirements for Potline Sources

Particulate matter is emitted from potline operations from both the uncontrolled potroom roof vents and the potline dry scrubbers. Potline operations are also covered by a separate, more specific particulate matter standard contained in WAC 173-415-030(2). This regulation limits the emissions of particulate matter from the reduction process (potlines) to no more than 15 pounds of particulate matter per ton of aluminum produced. Compliance is determined by a series of monthly emissions testing by EPA Reference Method 14 from the roof monitor system in Potroom 4 roof vent and from representative primary control device reactors and stacks. A single monthly result is then calculated to determine compliance for the entire month.

All aluminum smelters are required to meet the emission standards of WAC 173-415-030 and -060. WAC 173-415-030 states that "specific emission standards" listed in this chapter will take precedence over the general emission standards of Chapter 173-400 WAC. The requirements of WAC 173-415-030(2) are at least as stringent as and take precedence over the requirement for grainloading in WAC 173-400-060.

F) Ambient and Forage Fluoride Standards and Monitoring (1.j – 1.n):

Order No. DE 99AQ-I012 describes the requirement of routine monitoring of ambient air and forage for fluoride nearby the plant.

G) Visible Emissions

The consolidated order includes the following condition for most emission units, "If visible emissions are observed at any time, the observation shall be documented and corrective action initiated as soon as practical but not to exceed 24 hours." This requirement is included in the Air Operating Permit in permit condition II.1.a.

H) Potroom Operation & Maintenance (6.1.b):

Operation and maintenance of processes and emission controls, in a manner consistent with good air pollution control practice, is a very substantial and consequential applicable requirement. As has been pointed out, over ninety percent (90%) of a potline's PM and fluoride emissions come from the potroom roof vents. These emissions are a direct result of the quality of the operation and maintenance activities in the potrooms. These operation and maintenance activities affect both gaseous emissions such as gaseous/hydrogen fluoride and particulate emissions.

Proper operation and maintenance encompasses many qualitative areas ranging from shield condition and placement to ore station leakage to general housekeeping. Pot shield condition and placement are a primary concern but not the only concern for good air pollution control practice.

For the purposes of the Air Operating Permit, potroom compliance with WAC 173-415-030(6) will be demonstrated through worker training and weekly inspections. Kaiser will be required to conduct an annual training program in operation and maintenance practices, consistent with good air pollution control practice, for its employees. Teaching employees the environmental repercussions of their actions is a means to build awareness and annual training is a means to refresh the effect their actions have on the environment. The permit will also require Kaiser to conduct weekly inspections to reinforce the training and to evaluate the quality of the training. The intent of the weekly inspections is to assess, for example, how well Kaiser is maintaining the pot doors in good repair, how well workers are minimizing the number of unnecessarily open doors, or how well work practices are minimizing emissions.

I) Collection and Removal Efficiency (6.1.c):

WAC 173-415-030(1)(b) requires potline primary emission control systems to be "designed so that the control of fluoride emissions will be equivalent to a total fluoride collection efficiency of ninety-five percent for center worked pre-bake pots. A primary emission control system with a design removal efficiency of at least ninety-five percent of the fluoride collected is required."

Hooding efficiency is potentially a valuable measurement of environmental performance. Over ninety percent of a primary aluminum smelter's PM and fluoride emissions come from the potroom roofs and is in large part due to emissions escaping the pot's emission collection system. Accordingly, particulate and gaseous emissions of pollutants from the potrooms are by and large a function of hooding efficiency. Any effort to improve hooding efficiency has a direct effect on reducing emissions to the atmosphere.

WAC 173-415-030(1)(b) requires, on an ongoing basis, at least 95% collection efficiency, and separately, at least 95% removal efficiency for center worked prebake cells. The treatment efficiency requirement is easily met by the dry alumina scrubbers. These scrubbers are typically better than 99 % efficient at normal operating conditions. In the past, Kaiser often failed to meet the 95% collection efficiency due to poor potroom operation and maintenance. Kaiser invested in their primary control systems in the potrooms in 1998 to ensure MACT (see section J) compliance and these expenditures were reflected in their emissions data. MACT limits for total fluoride and monitoring requirements for HF monitoring are more stringent than the collection efficiencies required under state rules. Compliance with MACT will ensure compliance with the 95% collection efficiency.

J) Hazardous Air Pollutants and Primary Aluminum MACT (3.11, 4.2, and 6.6)

In October, 1997, USEPA promulgated National Emission Standards for Hazardous Air Pollutants (NESHAPS) representing Maximum Achievable Control Technology (MACT) for the primary aluminum industry. These rules are contained in the Code of Federal Regulations at 40CFR Part 63, Subchapter LL. Hazardous air pollutants (HAPs) for this industry include hydrogen fluoride and polycyclic organic matter, (POM). The MACT standards for primary aluminum were further subcategorized into major process areas producing emissions of either or both of these HAPs including potlines, paste plants, and bake ovens, and for potlines, still further subcategorized by the type of reduction cell employed. Kaiser's Mead Works is categorized in the federal MACT regulations as being within the center worked prebake two (CWPB2) subcategory.

In pre-bake plants, potlines produce and emit fluoride in both gaseous and particulate forms. Total fluoride standards address both gaseous and particulate forms of fluoride. POMs are not of concern in prebake plant potline emissions because they are driven off from the anode material during the anode baking process. Thus, MACT standards for prebake potlines address only total fluoride.

The MACT standards and (monitoring) requirements have profound impacts to the fluoride air emissions control from aluminum smelters. All three Prebake 2 smelters in Washington have installed continuous emissions monitors (CEMs) for gaseous/hydrogen fluoride emissions monitoring for each potlines in order to meet the MACT monitoring requirements. Kaiser has installed eight CEMs for its eight potlines. Because of the MACT requirements, the HF emissions discharged from the Kaiser's 16 potroom roofs were reduced from 876 tons in 1998 to 51 tons in 2000.

The paste production process produces POM emissions but fluoride emissions are not significant. Incoming coal tar pitch, used as the binder for coke in the manufacture of green anodes, contains substantial quantities of polycyclic aromatic hydrocarbons, which can escape during the melting, mixing and pressing processes. MACT standards for paste plants require a specific technology for POM emission control; dry coke scrubbers. Other technologies may be used if equivalency is demonstrated. Kaiser Mead has already used a dry coke scrubber system for years.

Primary aluminum MACT regulations will apply at the time of the restart of the facility.

K. Hazardous Air Pollutants and Secondary Aluminum MACT (7.5)

On March 23, 2000, the USEPA promulgated National Emission Standards for Hazardous Air Pollutants (NESHAPS) representing Maximum Achievable Control Technology (MACT) for the secondary aluminum industry. These rules are contained in the Code of Federal Regulations at 40 CFR Part 63, Subpart RR. Hazardous air pollutants (HAPs) for this industry include organic HAPs, inorganic gaseous HAPs (hydrogen chloride, hydrogen fluoride and chlorine) and particulate HAP metals. These

MACT standards apply to secondary aluminum production facilities using clean charge, aluminum scrap, foundry returns or molten metal as the raw material and performing, among other things, including one or more of the following processes: furnace operations such as melting, holding, refining, fluxing or alloying; in-line fluxing; or dross cooling.

Kaiser's permit includes those conditions that are applicable only to existing Group 1 furnaces. Requirements for affected units that Kaiser does not have at its Mead smelter are not included in this permit. Kaiser must demonstrate compliance with the secondary MACT requirements by March 24, 2003, or within 180 days of restart of the secondary aluminum operations, whichever is later.

L) Insignificant Emission Units and WAC 173-400-105, WAC 173-401-530(2)(c)

Since monitoring, recordkeeping, and reporting have not specifically been required by Ecology for insignificant emission units per WAC 173-400-105 (First Paragraph), there are no air operating permit monitoring, recordkeeping, and reporting requirements for the insignificant emission units required by the permit. In the event that such monitoring, recordkeeping, and reporting requirements are imposed pursuant to WAC 173-400-105, an IEU would no longer qualify for the exemption from operating permit testing, monitoring, reporting or recordkeeping contained in WAC 173-401-530(2)(c). Further, WAC 173-401-530(2)(c) states that permits shall not require testing, monitoring, reporting or recordkeeping for IEUs except where generally-applicable requirements of the SIP specifically impose such requirements. At the time of permit issuance, there are no such requirements applicable to IEUs.

E) Numbering Sequence of Emission Units:
Kaiser's emission units (including insignificant emission units and activities (IEUs) and those subject to only the generally applicable requirements) are numbered in sequence in the permit application. The facility-wide generally applicable requirements apply to the whole facility, including IEUs. The air operating permit rule states, however, that IEUs are not subject to testing, monitoring, recordkeeping, reporting and compliance certification requirements unless the generally applicable requirements in the State Implementation Plan (SIP) impose them [WAC 173-401-530(2)]. The Washington SIP does not impose any specific testing, monitoring, recordkeeping, reporting or certification requirements for the generally applicable requirements for IEUs. Therefore, the permit does not include the IEUs in the respective process tables and does not require any testing, monitoring, reporting, recordkeeping, or compliance certification requirements for IEUs. Since all emission units in the facility are subject to the generally applicable requirements, only the emission units with additional requirements were included in the process tables.

To avoid confusion about why there are missing numbers in the emission unit numbering sequence, the sequence all of the emission units are summarized below.

The permittee is required to include emission units defined as insignificant on the basis of size or production rate in accordance with WAC 173-401-533. Those emission units are identified in the table below.

PROCESS	EMISSION UNITS INCLUDED IN THE PERMIT (SUBJECT TO SPECIFIC REQUIREMENTS IN ADDITION TO GENERALLY APPLICABLE REQUIREMENTS)	EMISSION UNITS SUBJECT TO ONLY GENERALLY APPLICABLE REQUIREMENTS	IEUs
1 Overall Facility			1-1 General Plant Maintenance
			1-2 Street/pavement sweeping
			1-3 Air conditioning
			1-4 Building construction/demolition
			1-5 Office Activities
			1-6 Bathroom and shower facilities
			1-7 infirmary
			1-8 vehicles in parking lots
			1-9 solid waste containers
			1-10 Lawn/landscaping activities
			1-11 fire fighting and training equip.
			1-12 internal combustion vehicle engines
			1-13 sampling connections
			1-14 vehicular traffic
			1-15 welding
			1-16 bottled welding gas
			1-17 small gas-fired area heaters
			1-18 Material Transfer
2 Coke Calcining	2-4 Baghouse 11 (Cooling Kiln)	2-1 Baghouse 2	**2-2 Bldg 12 vents**
	2-14 Baghouse 5 (Air Control)	2-6 Baghouse 10	**2-3 Bldg 4 vents**

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The permittee is required to include emission units defined as insignificant on the basis of size or production rate in accordance with WAC 173-401-533. Those emission units are identified in the table below.

PROCESS	**EMISSION UNITS INCLUDED IN THE PERMIT (SUBJECT TO SPECIFIC REQUIREMENTS IN ADDITION TO GENERALLY APPLICABLE REQUIREMENTS)**	**EMISSION UNITS SUBJECT TO ONLY GENERALLY APPLICABLE REQUIREMENTS**	**IEUs**
		2-8 Tank Vent baghouse	**2-5 (Baghouse 3 (Unused and abandoned)**
		2-11 baghouse #8 (30 ton Nahcolite tank)	**2-7 Baghouse 4 (removed and demolished).**
		2-12 Baghouse 6 (400 ton Nahcolite Tank)	2-9 Cumbustor emergency vent
		2-13 Baghouse 7 (200 ton storage)	2-10 Quench Reactor emergency vent.
		2-15 Baghouse 9 (Waste sodium sulfate)	2-16 (Maintenance & Housekeeping)
3 Green Carbon	3-1 Coke Unloading Baghouse (52 NW)	3-2 Coke Transfer (52 SW)	3-3 Bldg. 52 vents.
	3-7 Central Plenum Baghouse	3-4 Baghouse 81N	3-11 Bldg 54 Roof Vents
	3-10 Green Carbon Vacuum baghouse	3-5 Baghouse 53C	3-12 Green Carbon Fugitive emissions.
	3-14 Anode Paste Scrubber	3-6 Baghouse 80 S	3-13 Gas Fired liquid pitch heaters
		3-8 Fresh Coke Airveyor baghouse	
		3-9 Reacted Coke Airveyor Baghouse	
		3-15 Dust Airveyor baghouse	

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4 Baked Carbon Plant	4-1 Procedair Scrubber stack	4-4 Spencer System Baghouse	4-5 Building vents from Buildings 53,55, 58, 60, 58A, 58B, 59A and 300
	4-2 West Anode Cleaner baghouse		4-6 Bldg 58 and 60 emergency vent stack. (Unused)
	4-3 East Anode Cleaner baghouse		4-7 Building 58 emergency vent stack (Unused)
	4-10 Fresh Alumina bin vent		4-8 Building 53 and 55 emergency vent stack. (Unused and disconnected)
	4-11 Reacted alumina bin vent		4-9 Area miscellaneous fugitive emissions.
5 Anode Rodding	5-1 New baghouse (vibrating conveyor)	5-4 Pangborn Baghouse	5-6 Bldg. 57 Roof Vents
	5-2 Fine Cleaner baghouse	5-5 Flash Welding Baghouse	5-7 Manual Welding operations
	5-3 Baghouse 32 F South	5-13 Electromelt Baghouse	5-8 Bldg 32 Vacuum system
	5-10 Spray Station Baghouse		5-9 Pouring station vents
			5-11 Holding Furnace fugitive emissions.
			5-12 Cast Iron Preheater vent
			5-14 Bldg 32 Roof Vents

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6 Potroom Operations	6-4 Potroom Scrubber Reactors (total of 64 stacks)	6-1 100 series baghouses	6-2 Day Tank atmospheric vents
		6-3 500 series baghouses	6-6 Miscellaneous fugitive emissions (Material handling)
		6-5 400 series baghouses	6-9 Building 111 roof vents
	6-7 Potroom Roof Vents (16 potrooms)	6-8 Baghouse 803 (Bag Stripping)	6-10 welding fume vents
7 Metal Products	7-1 TAC Baghouse		7-2 Cruce Heater vents
	7-4 Cruce Cleaner Baghouse		7-3 Bldg. 35 roof/wall vents
			7-5 Bldg. 35A Roof vents
	7-6 Furnace Vent		
			7-7 Shot drier vent
			7-8 Bldg 34 Roof/wall vents
			7-9 Cruce cleanings storage area
8 Ancillary Operations	8-4 Baghouse 480	8-1 Super Cleaning Baghouses (2)	8-2 Housekeeping airveyor vacuum system vent.(1)
	8-6 Baghouse 477	8-8 Baghouse 490	8-3 Housekeeping airveyor vacuum system vent.(2)

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	8-7 Baghouse 475	8-10 Ore Screening Baghouse	8-5 Bldg. 36 vents
	8-9 A/B Belt Baghouse		8-11 Bldg. 32A vents
	8-32 Old Boiler stacks.	8-13 Bath Crushing Baghouse	8-12 Bath storage shed loading/unloading fugitives.
	8-33 New Boiler Stack	8-15 Electrostatic Precipitator	8-14 Vacuum system vent
			8-16 Bldg. 32F vents
			8-17 Bldg. 32H vents
			8-18 Bldg. 32N power vent
			8-19 Bldg 32N vents
			8-20 aspirator cleaner vent
			8-21 Bldg. 34 vents
			8-22 Bldg. 32SC vents
			8-23 Mixer power vent
			8-24 90 day accumulation area
			8-25 5000 bbl diesel storage tank (1)
			8-26 5000 bbl diesel storage tank (2)
			8-27 Sewage Treatment Plant
			8-28 Closed Potlining Landfill vents.
			8-29 Inert Material Landfill
			8-30 N. Court 25 Bldg. Vents.
			8-31 Bldg 32M vents

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			8-34 Bldg. 66D vents
			8-35 PAML Lab ESP
			8-36 Bldg 40B Lab vents
			8-37 Bldg 40B Roof Vents
			8-38 Bldg 41 Lab hood vents.
			8-39 Bldg 41 Roof vents
			8-40Bldg 58E lab equip. hood vents.
			8-41 Tank 119 bin vent
			8-42 Tank 120 bin vent
			8-43 Tank 121 Bin vent
			8-44 Miscellaneous fugitive emissions
			8-45 Condensate tank vents
			8-46 Siphon furnace power vent.
9 Maintenance Operations			9-1 Vents from maintenance and repair shops. (15, 34, 44, 45, 50, 51, 56A, and 66M)
			9-2 Bldg. 44 Welding power vents
			9-3 Bldg. 44 forge vents
			9-4 Bldg. 44 furnace vents
			9-5 Bldg 56 crusher (abandoned)

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			9-6 Bldg 85 vents
			9-7 masonry saw baghouse (abandoned)
			9-8 mason shed fugitives (abandoned)
			9-10 Propane distribution bldg. Vents.
			9-11 Rectifier Bldg. vents
			9-12 Bldg. 46 sawdust collector
			9-13 Paint booth power vent.
			9-14 Bldg 46 vents
			9-15 solvent satellite storage tank vent.
			9-16 Paint/solvent storage bldg. Vents (Bldg. 46A)
			9-17 Air Compressor Bldg vents. (Buildings 62, 63, 66C, & 110)
			9-18 Sandblast shed
			9-19 Non-PCB transformer yard and storage.
			9-20 Oil and lubricant storage building vent. (Bldg. 43)
			9-21 Small fuel storage tanks
			9-22 Miscellaneous fugitive emissions.

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Orders

Existing Orders

Kaiser's existing orders are listed below:

Order DE 88-385 (3/13/89)
Order DE 89-13 (2/21/89)
Order DE 89-I156 (10/24/89)
Order DE 91-I034 (4/4/91)
Order DE 91-I046 (4/26/91)
Order DE 91AQ-I074 (8/2/91)
Order DE 92AQ-I025 (2/6/92)
Order DE 92AQ-I056 (4/27/92)
Order DE 92AQ-I076 (6/12/92)
Order DE 92AQ-I116 (9/28/92)
Order DE 93AQ-I075 (9/8/93)
Order DE 93AQ-I077 (9/8/93)
Order DE 94AQ-I017 (4/8/94)
Order DE 94AQ-I019 (5/5/94)
Order DE 94AQ-I083 (10/24/94)
Order DE 94AQ-I087 (12/15/94)
Order DE 96AQ-I071 (9/24/96)
Order DE 96AQ-I072 (10/14/96)
Order DE 96AQ-I073 (10/14/96)
Order DE 97AQ-I058 (8/15/97)
Order DE 97AQ-I081 (2/20/98)
Order DE 98AQ-I017 (3/25/98)
Order DE 98AQ-I053 (9/30/98)
Order DE 98AQ-I058 (11/5/98)
Order DE 98AQ-I061 (2/4/99)
Order DE 99AQ-I012 (4/7/99)
Order DE 99AQ-I029 (6/4/99)
Order DE 01AQIS-3053 (7/23/01)
Order DE 01AQIS-3285 (10/24/01)
Order DE 01AQIS-3285 Amendment #1 (4/9/03)

Consolidated Orders

Order No. DE 01AQIS - 2005 amends the following orders:

Order DE 88-385 (3/13/89)
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